UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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BLAKELY SOKOLOFF TAYLOR & ZAFMAN
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER
KANG, INSUN

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>31 October 2007</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>6-20</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>6-20</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   This action is in response to the amendment filed on 10/31/2007.

2.   As per applicant's request, claims 6, 8-11, 13-16, and 18-20 have been amended.

3.   Claims 6-20 are pending in the application.

Claim Rejections - 35 USC § 101

4.   35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5.   Claims 6-10 are rejected under 35 U.S.C. 101 because the claimed invention is directed

to non-statutory subject matter.

Claims 6-10 are non-statutory because they are directed to an apparatus comprising a

"machine-readable medium" that includes a propagated medium such as a carrier wave and a

signal as recited in the instant specification (i.e. "The machine-readable medium includes any

mechanism that ...*transmits*...information," page 12). Such medium does not have a physical

structure, rather it is the physical characteristics of a form of energy, such as a frequency,

voltage, or the strength of a magnetic field, define energy or magnetism per se. Moreover, it

does not fit within the definition of the categories of patentable subject matter set forth in § 101.

Therefore, the claims are non-statutory. It is recommended to change the term as a computer-

storage medium.

The following link on the World Wide Web is for the United States Patent And

Trademark Office (USPTO) policy on 35 U.S.C. §101. The following link on the World Wide

Web is for the United States Patent And Trademark Office (USPTO) policy on 35 U.S.C. §101.

<http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101_20051026.pdf>

Claim Rejections - 35 USC § 103

6.　　The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7.　　Claims 6-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hopkins et

al. (US Patent 4,961,141) hereafter referred to as "Hopkins" in view of Auslander et al. ("Fast,

Effective Dynamic Compilation," ACM, page 149-159, 1996).

Per claim 6:

Hopkins discloses:

- assigning a first register class to at least one symbolic register in at least one

  instruction (i.e. "for each equivalence class, forming the logical OR function of

  register usage information for all symbolic registers in the class," col. 1 lines 55-60;

  "initializing in function block 27...i is set equal to the first register," col. 4 lines 21-

  34)

- assigning a second register class to the at least one symbolic register (i.e. after step 34 in Fig 4, i+1 is set back to FIRST REG which assigns the i+1 to the symbolic register);

Hopkins does not explicitly teach conjunctive forward dataflow analysis. However, Auslander teaches it was known in the pertinent art, at the time applicant's invention was made, to evaluate as false as long as one of its conjunctive clauses evaluates as false (i.e. page 152, second paragraph, lines 1-11). It would have been obvious for one having ordinary skill in the art to modify Hopkins' disclosed system to incorporate the teachings of Auslander. The modification would be obvious because one having ordinary skill in the art would be motivated to reduce the register assignment sets by assigning a register class only if the conjunctive clause is true as suggested by Auslander (i.e. page 152, left col., paragraph 2-3).

Hopkins further discloses:

- reducing register class fixups for the assignment of the second register class (i.e. "dead code in the program is removed in block 6," col. 2 lines 50-60; "fix up code is inserted...move the value from one space to another," col. 3 lines 33-44);

- renaming the at least one symbolic register (i.e. "If so, new names are made up in function block 39 so that there is a different name for each context," col. 4 lines 41-44).

- Wherein each instruction includes assignment of one of the first register class assigned and the second register class assigned (i.e. after step 34 in Fig 4, i+1 is set back to FIRST REG which assigns the i+1 to the symbolic register).

Per claim 7:

Hopkins further discloses:

- said assigning the first register class is an initial assignment (i.e. "SET i = FIRST REG," Fig 4A).

Per claim 8:

Hopkins further discloses:

- marking a register class assignment map that operates to track register class assignments at a block entry of a compilation unit (i.e. "i is set equal to the first register," which is a block entry initializing the function block; col. 4 lines 21-25; see also Fig 4 the loop block);

- marking the register class assignment map at a block exit of compilation unit (i.e. see Fig 4, in function block 34, i is indexed by adding one to i before looping back to decision block 28; "in the decision block 25, a test is made to determine if there are any more operations to be processed...otherwise, control passes to the interlude logic," which sets i to N (exit point) after the final loop, col. 4 lines 15-19)

- determining the register class assignment map at an entry of each instruction in a block(i.e. ; "a test is made in decision block 28 to determine if i is less than or equal to the last register," col. 4 lines 21-34; the decision blocks 28 and 29 are performed at an entry point i)

- determining the register class assignment map at an exit of each instruction in the

  block (i.e. ; "a test is made in decision block 28 to determine if i is less than or equal

  to the last register," col. 4 lines 21-34; the decision blocks 28 and 29 are performed at

  an exit point where i is set to N (exit point) after the final loop).

Per claim 9:

Hopkins further discloses:

- hoisting and sinking the register class fixups (i.e. "fix up code is inserted...move the

  value from one space to another," col. 3 lines 33-44);

- and removing the register class fixups that are unnecessary (i.e. "dead code in the

  program is removed in block 6," col. 2 lines 50-60).

Per claim 10:

Hopkins further discloses:

- removing dead code (i.e. "dead code in the program is removed in block 6," col. 2

  lines 50-60).

Per claims 11-15, they are the system versions of claims 6-10, respectively, and are

rejected for the same reasons set forth in connection with the rejection of claims 6-10 above.

Per claims 16-20, they are the computer versions of claims 6-10, respectively, and are

rejected for the same reasons set forth in connection with the rejection of claims 6-10 above.

Response to Arguments

8.   Applicant's arguments filed on 10/31/2007 have been fully considered but they are not

persuasive.

The applicant states that Hopkins and Auslander do not disclose each instruction includes

assignment of one of the first register class assigned and the second register class assigned.

In response, Hopkins states that "i is set equal to the first register," which is a block

entry initializing the function block (col. 4 lines 21-25; see also Fig 4 the loop block) and i+1 is

set back to the first register which assigns the i+1 to the symbolic register (Fig 4).

9.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Insun Kang whose telephone number is 571-272-3724. The

examiner can normally be reached on M-F 8:30-5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, MENG AI AN can be reached on 571-272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.' Information

regarding the status of an application may be obtained from the Patent Application Information

Retrieval (PAIR) system. Status information for published applications may be obtained from

either Private PAIR or Public PAIR. Status information for unpublished applications is available

through Private PAIR only. For more information about the PAIR system, see http://pair-

direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the

Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from

a USPTO Customer Service Representative or access to the automated information system, call

800-786-9199 (IN USA OR CANADA) or 571-272-1000.

I. Kang
AU 2193